

Neera is a delicious health drink getting popularity worldwide due to its astounding medical advantages. Though neera is commercialized in Kerala and is widely promoted as a health drink, there is lack of scientific data showing its health benefits. Therefore CDB under Technology Mission on Coconut (TMOC) initiated a study with Amrita School of Pharmacy, Amrita University on nutritional and medicinal properties of neera and selected neera products through various in vitro and in vivo assays.

Nutritive facts estimation

Findings on nutritional fact reveal that neera sugar is dominant in nutritive composition, followed by neera honey, than neera. From evaluation and comparison of element composition it was observed that the different macro elements (Na, K & Mg) present in neera products were acceptable as per the daily recommended limits by Food and Drug Regulation authority (FDR). Potassium was predominantly found in neera followed by neera honey. Regarding the micro minerals (Fe, Zn, Cu, S & Mn), neera honey was found to be rich with Fe. Ni found in the samples was within the permissible limit. The trace elements (Pb and Hg) were also analyzed and found to be below the detectable limit.

Quantitative estimation of Antioxidants

The major antioxidants estimated quantitatively are vitamin C, phenols, flavonoids and tannins and results revealed the presence of Vit C and total phenolic content in much greater quantity than others. Antioxidants have been reported to inhibit the propagation of free radical reactions and protect the human body from diseases. Vitamin C is one of the most important antioxidant and an essential constituent in food with specific and vital functions in the body. Among different fruit juices available in the global market, orange and citrus fruit juices acquired more attention due to the presence of high level of vitamin C (50mg/100g) and contribute health benefits, especially as high power antioxidants. Considering problems with the routine consumption of highly acidic juices, less acidic neera can be a valuable alternative with rich level of vitamin C.

Anti-diabetic assays

Anti-diabetic activity of samples was assessed in vitro by α -amylase and α -glucosidase inhibition assay. It is seen that neera sugar is having anti-diabetic activity comparable with reference standard acarbose. This result has significant clinical importance as diabetes is a common life style disease and by replacing the

Nutritional and Medicinal properties of Neera and Neera products

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common sugar with neera sugar it may be possible to control the disease.

Immuno modulatory effect

Immunomodulators are agents that modify immune response or function of the immune system by stimulation of antibody formation or by inhibition of white blood cell activity. The immune system primarily is responsible for the recognition and abolition of pathogens and foreign substances. The immunomodulatory potential of the samples were measured by undertaking two major tests. The study evidences strong immunostimulant activity of test products, as demonstrated by enhancement of HA titre and paw oedema and can be inferred as the potential of the test products to defence against parasites and bacteria.

Diuretic activity

The in vivo diuretic activity of neera and its products. Data demonstrate that diuretic index is significantly high in neera (2.32) with high urinary output (3.58 ± 0.76 mL) and urine pH (6.45 ± 0.42) up to first 5 h, compared to control group. Neera revealed its potential diuretic effect through higher urine volume and pH with moderate ion excretion up to first 5 h compared to reference standard. Natriuretic effect of neera was revealed from the non-significant elevation of chloride ion excretion.

Haematinic activity

By considering the high prevalence of anaemia (haemolytic and iron deficiency anaemia) worldwide, we conducted haematinic activity study to assess the effect of neera and its products on haematological parameters. Administration of samples and standard significantly improved the altered haematological parameters at the end of first treatment week (day 7), whereas anaemic control group did not show such progression at this period. Higher activity exhibited by neera honey will be due to the high iron content in the product. The spleen histology further confirms it with normal splenic histology of control animals having red pulp and white pulp. Whereas, anaemic control rats revealed distorted red pulp with relative attenuation in white pulp proportion. Administration of standard and samples showed splenic sections with improved red pulp and well defined splenic nodules in white pulp. Neera honey exhibited maximum erythroid hyperplasia compared to other groups and this increased number of erythroblastic islands will be the reason behind the maximum effects observed in hematological analysis in this group.



Biochemical analysis

Biochemical parameters- the bio markers for considering the vital organ functions; especially liver and kidney, were evaluated. Neera and its products significantly decreased liver function panel such as AST and ALP, with insignificant reduction in ALT and bilirubin level after two weeks of peroral treatment. The noticeable reduction of these enzymes in treated animals to that of normal rats insight into the potential therapeutic property of neera and its products in liver conditions with elevated enzyme levels. The insignificant variation observed with plasma bilirubin in testers compared to control group endorses the absence of cholestasis, further confirms the safety of excretory functions of liver with neera products.

The kidney function parameters- serum urea and creatinine exposed statistically insignificant reduction at the study period. Moreover, the absence of significant variation in kidney markers; urea and creatinine, testimonies the safety of neera products in this vital organ. The histological findings on liver, heart and kidney reveals the absence of cytoarchitectural distortion as compared to that of control organs, further established the safety of the products.

Conclusion

By considering the high Vitamin C content and antioxidant potential, neera can beat the unhealthy carbonated beverages and neera honey might be a good alternative over normal honey due to its high iron content. In addition neera sugar can be a healthy option particularly for diabetic patients. Beyond this, neera exhibited significant immune modulatory activity, natural diuretic activity without much saluretic effect and good haematinic activity in vivo. The major findings of the various in vitro and in vivo studies conducted are reported in this write up. In an era like this when we often hear about the health hazards of various artificial drinks, it is important to understand the health benefits of the natural drink neera, especially its effect on enhancing the immune power. Its use should be promoted widely across the country and also in Kerala, a state that is known in the name of coconut trees. ■